FLOODPLAIN FOREST GRAZING MANAGEMENT: PAST, PRESENT AND FUTURE

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Introduction

In addition to the ever more unpredictable floods as a consequence of global climate change, forest management and agriculture is impeded to a great extent in the floodway areas of Central Europe by the relentless propagation of invasive species, representing not only an economic disadvantage but a substantial threat to nature conservation as well. Our research focused on the former, current and future role of grazing in floodway forest areas.

"*Grazing in the forest has always been, is and always will be*" you can read in the work by Frigyes Fuchs published in 1861 entitled 'Primeval forests in Hungary'. This sentence holds true up in Hungary and the Carpathian-basin as a whole to date in spite of the fact that since 1961 grazing in forested areas is supposed to be banned by the force of law. With respect to the development of agroforestry system, an approach strongly encouraged and subsidised by the European Union, it is indispensable to clarify the role of forest grazing which is part of these systems. Forest grazing is a thousand years old practice of extensive animal husbandry based on the natural capital and ecosystem services provided by the land in question. A fundamental scenery of pasturing animal husbandry is the area covered by woody vegetation, with the key function to ensure safety and predictability of grazing under extreme weather conditions. In the research project the answers to the following questions were looked for: How grazing on floodway land was managed before the 1960s and how has it changed? What kind of vegetation characterises the grazed and non-grazed forest areas in the floodway? What kind of a role grazing in agroforestry system might have in the management of floodway areas?

Materials and methods

The very complex range of issues was studied using multidisciplinary methods. on multiple locations in the Great Hungarian Plain using a variety of research methods. Research was conducted in forest stands on the floodway in Hungary, Serbia and Romania. Along the Tisza and Hármas-Körös rivers (Hungary) 58 of semi-structured interviews were made with local farmers and conservation rangers. Comparative structural studies of habitats in grazed and non-grazed tree stands in the floodway of Tiszaalpár (county Bács-Kiskun, Hungary) (Sample site No 1) were carried out in 2015. A current habitat/biotope map was drawn up along the Hármas-Körös (Sample site No 2, county Csongrád and county Békés, Hungary) river in 2015 on a land of 6600 hectares in a scale of 1:2000, which was supplemented with the analysis of landscape changes using aerial photographs from the 1960s. A three days field tour was made in January 2016 on the Serbian section of the river Temes (Sample site No 3) visiting grazed and non-grazed hybrid poplar stands in the floodway. Forest ecology surveys were completed on a three days (in 2014) and a two days (2015) field visit to the hardwood gallery forests along the river Sava (Sample site No 4, Morović), and semi-structured interviews with pig farmers (7 people) and local forester staff (4 persons).

Results

In the floodway areas of the Hungarian Tisza and Hármas-Körös a typical small-holders husbandry involving agroforestry dominated up to the end of the 1980s. This kind of management was largely abandoned by the beginning of the 1990s. As a result, non-native invasive species (*Amorpha fruticosa*, *Fraxinus pennsylvanica*, *Acer negundo*) propagated dramatically.

You can see on Sample site No 1 that coverage ratio of invasive species was diminished due to grazing (*Amorpha fruticosa*: non grazed: 50%, grazed 5%) **(Figure 1)**.

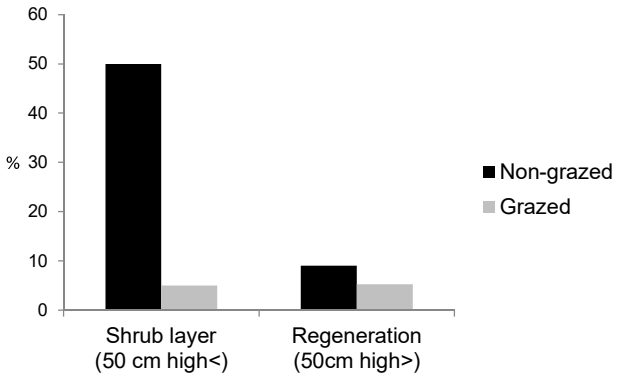

Figure 1: Average Amorpha fruticosa coverage on grazed and non-grazed shrub layer and re-growth in willow-poplar stands of the floodway (Tiszaalpár, Hungary)

On Sample site No 2 the lower canopy of the non-grazed willow stands in the floodway of Hármas-Körös consists of green ash, with the shrub level made up of dense desert false indigo stands. As a result of the grazing cattle, a very diverse marshland, wetland grassy vegetation was formed under grazed willow stands. In the lower canopy of the hybrid poplar stands along the Hármas-Körös green ash stands are frequently encountered and the bottom of the plantations is penetrated by dense desert false indigo cover without exception. Grazing is made in secret due to the legal ban, in other words farmers are interested in not leaving visible signs of grazing. As a result the lower level of the canopy and the shrub level is not removed, therefore the formation of the closed grass level can not be observed due to lack of sufficient light.
On sample site No 3 never grazed poplar stands with poplar stands grazed regularly since their plantation were compared along the Temes river. The impression given by never grazed poplar stands is fully identical with that found in sample site No 2. In the grazed stands, however, no invasive species were found in the lower canopy level and the coverage ratio of non-native invasive shrubs such as Amorpha fruticosa varied merely between 0 and 20%. Grass level vegetation coverage was nearly 100%. Species stocking and diversity of the wetland and marshland vegetation under the grazed hybrid poplar stands occasionally exceeded those of treeless grasslands nearby. Rubbing and bark chewing traces affecting the external layers of hybrid poplar trees were only found in the parts of the forest used as regular resting place for noon.

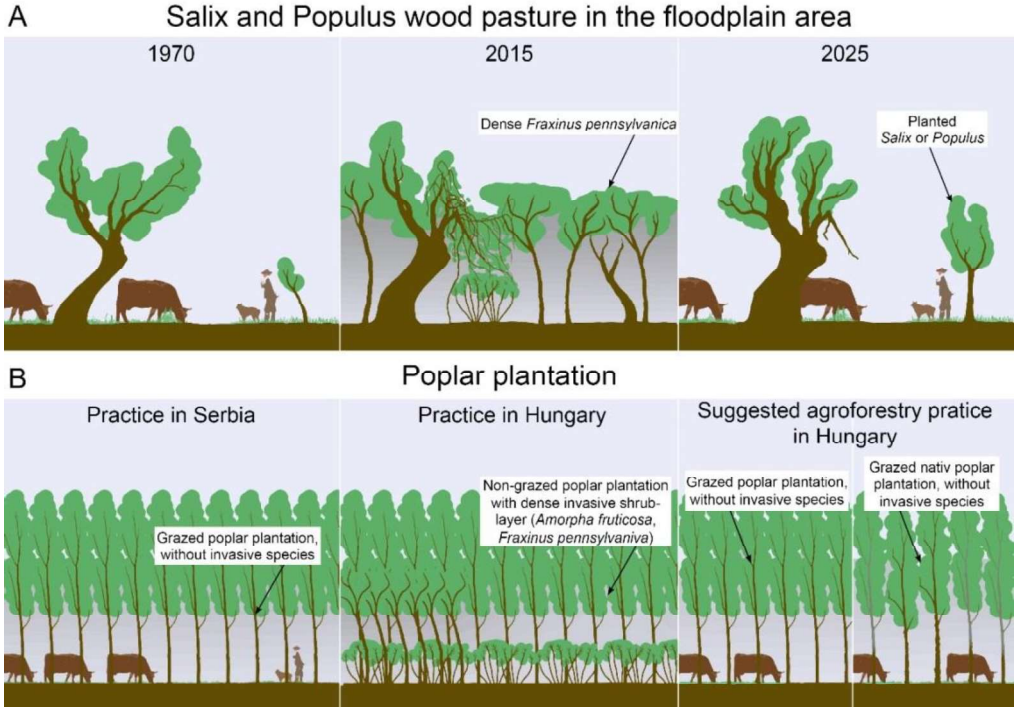

Figure 2. A) Past, present and potential future of softwood lots on the floodway. B) Current use of hybrid poplar stands in the floodway in Serbia and Hungary, and potential future management in Hungary, respectively

In the large hardwood gallery forests along the Sava River on sample site No 4 pigs have been raised in the forest for a period of several hundred years or maybe a thousand. Pigs currently are fed on corn in the morning and at night on the farmstead in the woods established exclusively for this purpose. They spend the rest of the day within a 3-5 km distance around the farm. Farmsteads are stationary for decades at some places and are frequently moved in others. Woodlots with closed canopies maintained on the same location for a very long have a very thin shrubbery level, but the shrub level of oak stands with a more open, gallery like canopy is rich in species and covers large areas (50-60%) in spite of intensive presence of pigs. It can be stated that the grazing of pigs has no adverse impact on the shrub level. Local pig farmers and foresters assist each other in managing the area.

Conclusions

Based on our experiences and measurements it can be concluded that grazing in forests stands of floodways was possible without diminishing the timber yields, and at the same time it suppresses invasive vegetation and has a substantial role in retaining local population as a secondary way of exploitation. Grazing of forests in the floodway in an agroforestry scheme may be a retaining economic factor for local population as well.

In summary, it can be concluded that controlled permission of forest grazing contributes to continue husbandry maintaining natural and cultural values alike, and hence, to the production of healthy food to the staying of country people on site. The importance of these factors in terms of nature conservation and society is highlighted by IPBES under the auspices by UN (www.ipbes.net).

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